REMARKS

The Examiner is respectfully requested to reconsider the rejection of claims 1 - 6, and 10 - 17 under 35 U.S.C. §103(a) as being unpatentable over Tai, et al. (U.S. Patent 6,411,745) in view of Parker et al. (U.S. Patent 5,323,247) in view of Ilbery, et al. (U.S. Patent 6,476,934). The Examiner correctly notes in the Official Action that Claims 2 - 9, 15 and 17 have been cancelled. Thus the rejections of Claims 2 - 6, 8, 15 and 17 in the Official Action noted above are moot, and no response with respect to these claims is necessary.

Applicants respectfully submit that the predicate for the Examiner's rejection of Claims 1, 10 - 14 and 17 is seriously flawed, and consequently every assertion thereafter as to patentability based upon the initial predicate is without proper foundation.

As a basic premise for this response, Applicants respectfully point out to the Examiner that the reference to Tai, et al. is not relevant to the present invention. Succinctly stated, Tai et al. disclose a gray scale printing system whereby the input is gray scale and the output is gray scale. Applicants teach a gray scale input and a digital output embodying half toning. Tai, et al. do NOT disclose a half toning process. There is no proper basis to combine Tai et al. with Parker et al. because Tai et al. is solely directed to a gray scale system and never considers any system other than a gray scale system. Note that Tai et al. state at Column 3, line 6 et seq.: "*After the image has been manipulated by the image manipulation unit 12, the image is sent to the image storage unit 14 which may store the image indefinitely to provide it to an image rendering unit 16.*" Then at Column 3, lines 9 to 16. Tai, et al. discuss in detail the metes and bounds of their system. They state: "*A grey scale, i.e., multibits per pixel grey level system, printing system 18 receives the image from the image rendering unit, which receives the image from the image storage unit 14 and prepares it for printing by the printing system 18. Typical grey scale printers are LEDs, lasers used in electrophotographic or photographic systems, electrographic writers, ink jet or thermal printers.*"

The Examiner seeks to provide a basis for the obviousness combination of the Tai, et al. reference with Parker by asserting on page 3 of the Official Action that "*Tai, et al. disclose a method for transforming a digitized image....*"; and further down on that same page over to page 4: "*As shown, Tai, et al.disclose a digital halftoning process.*" There is no disclosure in the Tai, et al. reference relative to the Applicants' binary output. Applicants respectfully submit that Tai et al. does not disclose transforming a grey scale image into a binary image. Thus there is no basis to combine the reference with Parker.

Applicants' invention, as depicted in Figure 1 of the application, shows an embodiment of the invention and illustrates how an image is divided into a *local region of interest* (ROI) and its neighborhood. The computations for a given pixel are based upon the ROI and its neighborhood. In Applicants' invention, an ROI is chosen from an input image. The region can be a window of varying dimensions. The neighborhood of the ROI includes additional image pixels from which statistical information is obtained. The image pixel values within the ROI are transformed to binary values and placed in corresponding positions in the output image according to the method described in Figures 2 and 3.

This summary of Applicants' invention clearly defines the critical difference between the prior art references and the present invention. As specifically set forth in the summary above and the specification on pages 5 and 6, et al., Applicants are providing a binary digital image output. As noted above, the input may be gray scale, but the output is binary. The prior art outputs of Tai et al. and Ilbery et al. are both gray scale images. The prior art disclosures are diametrically opposite that of the present invention. Applicants have set forth specific rules to follow to reorder their pixels.

The differences between the Tai, et al and Ilbery, et al. patents resides in the processing that is performed. The processing of Tai, et al. is "a linear interpolation of the neighboring original pixels comprising the window....." Applicants' processing is never a linear interpolation of neighboring pixels. The purpose of the Tai, et al. patent is to reduce moire patterns and so interpolation is helpful. Applicants perform different processing steps to obtain a binary output. This distinguishing feature is present in Claim 1 et al.

The reference to Ilbery, et al. also processes an image pixel by pixel, and uses a neighborhood region and produces an output. In Ilbery, et al., processing a pixel depends upon results of previously processed pixels. This is a necessity for their invention because the purpose is to compensate for output errors of previously processed pixels in order to make the final result more accurate. This type of operation must be done sequentially. Applicants' invention involves using a neighborhood, but does not use the output results of previously processed pixels, so it is not a sequential operation. The details in Ilbery, et al. of what processing is performed are completely different and much of the patent explains this in detail.

Accordingly, the nature of the processing is an important issue; not just that some processing is done and that some decisions are made. The processing as among the prior art references and Applicants' invention is totally different. The mention of "halftoning" does not warrant rendering Applicants' invention obvious. Applicants scan both half tone and text. Halftoning is only a part of their invention whereas the reproduction of a scanned halftone image is the sole focus of Tai, et al. (grey scale image) and Ilbery, et al. Applicants' invention deals with reproduction of scanned images containing text, line art and halftoned images. Applicants' invention is not specifically designed to eliminate Moire patterns in the reproduced halftoned image as in Tai et al., or in being extremely accurate in reproducing the light and dark halftoned regions as in Ilbery et al. Applicants for example, sharpen text using their method whereas Tai, et al.in fact blur their images through interpolation.

In order to analyze the propriety of the Examiner's rejections of Claims 1 - 6, 8 and 10 - 17 in this case, a review of the pertinent applicable law relating to 35 U.S.C. § 103(a) is warranted. The Examiner has applied the Tai, et al., Parker and Ilbery, et al. references discussed above using selective combinations to render obvious the invention.

The Court of Appeals for the Federal Circuit has set guidelines governing such application of references. These guidelines are, as stated are found in Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143, 227 USPQ, 543, 551:

> When prior art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than hindsight gleaned from the invention itself.

A representative case relying upon this rule of law is Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 5 USPQ 2d 1434 (Fed. Cir. 1988). The district court in Uniroyal found that a combination of various features from a plurality of prior art references suggested the claimed invention of the patent in suit. The Federal Circuit in its decision found that the district court did not show, however, that there was any teaching or suggestion in any of the references, or in the prior art as a whole, that would lead one with ordinary skill in the art to make the combination. The Federal Circuit opined:

> Something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. [837 F.2d at 1051, 5 USPQ 2d at 1438, citing Lindemann, 730 F.2d 1452, 221 USPQ 481, 488 (Fed. Cir. 1984).]

Applicants respectfully submit that there is no basis for the combination of the Tai, et al., Parker and Ilbery, et al. references cited by the Examiner. Applicants have pointed out that two of the three references teach in different directions. The Examiner has selected elements and/or steps from these references for the sake of showing the individual elements and/or steps claimed, without regard to the total teaching of the references. A major problem with the combination rejection is that Tai, et al. does not in fact teach what the Examiner contends that it teaches.

The Examiner is improperly picking and choosing. The rejections are piecemeal constructions of the invention. Such piecemeal reconstruction of the prior art patents in light of the instant disclosure is contrary to the requirements of 35 U.S.C. § 103.

> The ever present question in cases within the ambit of 35 U.S.C. § 103 is whether the subject matter as a whole would have been obvious to one of ordinary skill in the art following the teachings of the prior art at the time the invention was made. It is impermissible within the framework of Section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. (Emphasis in original) In re Wesslau 147 U.S.P.Q. 391, 393 (CCPA 1965)

This holding succinctly summarizes the Examiner's application of references in this case, because the Examiner did in fact pick and choose so much of the Tai, et al., Parker and Ilbery, et al. references to support his position and did not cover completely in the Office Action the full scope of what these reference disclosure fairly suggest to one skilled in the art.

Further, the Federal Circuit has stated that the Patent Office bears the burden of establishing obviousness. It held this burden can only be satisfied by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the reference.

> Obviousness is tested by "what the combined teachings of the references would have suggested to those of ordinary skill in the art." In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." ACS Hosp. Sys., 732 F.2d at 1577, 221 USPQ at 933. [837 F.2d at 1075, 5 USPQ 2d at 1599.]

The court concluded its discussion of this issue by stating that teachings or references can be combined only if there is some suggestion or incentive to do so.

In the present case, the skilled artisan, viewing any or all of the references would be directed toward a grey scale system than the digital system which is called for in the present invention. For the reasons listed above in this response with respect to the Tai, et al., Parker and Ilbery, et al. references, there is no proper basis to combine them.

Applicants submit that the claims as presently written are in a form which should result in their allowability. If the Examiner wishes to discuss via telephone the substance of any of the proposed claims contained herein with the intent of putting them into an allowable form, Applicants' attorney will be glad to speak with the Examiner at a mutually agreeable time and will cooperate in any way possible.

In view of the arguments and modifications to the claims, allowance of this case is warranted. Such favorable action is respectfully solicited.

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I hereby certify that this paper is being deposited on the date indicated below with the U.S. Postal Service as First Class Mail addressed to Commissioner of Patents & Trademarks, Post Office Box 1450, Alexandria, VA 22313-1450

Signature: _____ Date: March 12, 2004
Name: Thomas A. Beck

APPENDIX

CLAIMS (with indication of status) :

Claim 1. (Currently Amended) A method for transforming a digitized image, said method comprising: providing said image as a plurality of pixels, wherein data for each pixel is in a first format which is a grey scale image; and

processing said data of each of said pixels by employing data from a region of interest which includes at least one pixel following said each of said pixels, and includes a plurality of neighboring pixels,

D/ cont and producing a second format which is a binary image, and

said method further comprising determining a dynamic range of pixel values of pixels in an encompassing neighborhood of the region of interest, and

wherein the step of processing includes making dynamic adjustments depending on the dynamic range of pixel values, wherein the step of making said dynamic adjustments includes producing a visually pleasing transition between text and picture areas in said image;

and wherein said producing a visually pleasing transition includes:

if said dynamic range is high, implying said pixels in said encompassing neighborhood of said region of interest are in a text area or a line art area or in an area of an image that has a high contrast edge, wherein the edges of said text area, line art area and area of an image having high contrast edge are sharpened by computing a pixel data threshold value for said region of interest;

and comparing each pixel value in said region of interest to said pixel data threshold;

if said pixel value is greater than the pixel data threshold value,
a first value is placed in the corresponding position of the said second format image;

if said pixel value is less than or equal to the pixel data threshold value,
a second value is placed in the corresponding position of the said second format image;

if said dynamic range is medium,

computing a desired number of second values to be placed in said second format image in the region of interest;

ordering the pixels in the region of interest according to the ordering of a predetermined halftone array;

altering the order of a pixel in said ordering if said pixel has a value which is greater than the value of the next pixel in said order by a predetermined reordering threshold value;

repeating said altering of the pixel order until the first and second values chosen for the second format image are no longer changed;

choosing said desired number of second values for the second format from the beginning of the said order, and assigning the remaining pixels values in the region of interest to said first value;

if said dynamic range is low,
using said predetermined halftone array to compute said first and second values for said second format image.

Claims 2 - 9 canceled.

Claim 10. (Currently amended) The method as in claim ~~9~~ 1 where a number of second value is determined, said number to be placed in said second format grey scale image based on a weighted function of the image intensity values within the region of interest of said first format image.

Claim 11. (Currently amended) The method as in claim ~~9~~ 10 wherein said plurality of regions-of-interest form the entire said first grey scale format.

Claim 12. (Currently amended) An article of manufacture comprising a computer usable medium having computer readable program code means embodied therein for causing a digital image to be transformed, the computer readable program code means in said article of manufacture comprising computer readable program code means for causing a computer to effect the steps of :

providing said image as a plurality of pixels, wherein data for each pixel is in a first format which is a grey scale image; and

processing said data of each of said pixels by employing data from a region of interest which includes at least one pixel following said each of said pixels, and includes a plurality of neighboring pixels,

and producing a second format which is a binary image, and

said method further comprising determining a dynamic range of pixel values of pixels in an encompassing neighborhood of the region of interest, and

wherein the step of processing includes making dynamic adjustments depending on the dynamic range of pixel values, wherein the step of making said dynamic adjustments includes producing a visually pleasing transition between text and picture areas in said image;

and wherein said producing a visually pleasing transition includes:

if said dynamic range is high, implying said pixels in said encompassing neighborhood of said region of interest are in a text area or a line art area or in an area of an image that has a high contrast edge, wherein the edges of said text area, line art area and area of an image having high contrast edge are sharpened by computing a pixel data threshold value for said region of interest;

and comparing each pixel value in said region of interest to said pixel data threshold;

if said pixel value is greater than the pixel data threshold value,
a first value is placed in the corresponding position of the said second format image;

if said pixel value is less than or equal to the pixel data threshold value,
a second value is placed in the corresponding position of the said second format image;

if said dynamic range is medium,

computing a desired number of second values to be placed in said second format image in the region of interest;

ordering the pixels in the region of interest according to the ordering of a predetermined halftone array;

altering the order of a pixel in said ordering if said pixel has a value which is greater than the value of the next pixel in said order by a predetermined reordering threshold value;

repeating said altering of the pixel order until the first and second values chosen for the second format image are no longer changed;

choosing said desired number of second values for the second format from the beginning of the said order, and assigning the remaining pixels values in the region of interest to said first value;

if said dynamic range is low,

using said predetermined halftone array to compute said first and second values for said second format image.

13. (Currently amended) A program storage device readable by machine, tangibly embodying the program of instructions executable by the machine to perform method steps for transforming a digitized image, said method steps comprising the steps of:
providing said image as a plurality of pixels, wherein data for each pixel is in a first format which is a grey scale image; and

processing said data of each of said pixels by employing data from a region of interest which includes at least one pixel following said each of said pixels, and includes a plurality of neighboring pixels,

and producing a second format which is a binary image, and

said method further comprising determining a dynamic range of pixel values of pixels in an encompassing neighborhood of the region of interest, and

wherein the step of processing includes making dynamic adjustments depending on the dynamic range of pixel values, wherein the step of making said dynamic adjustments includes producing a visually pleasing transition between text and picture areas in said image;

and wherein said producing a visually pleasing transition includes:

if said dynamic range is high, implying said pixels in said encompassing neighborhood of said region of interest are in a text area or a line art area or in an area of an image that has a high contrast edge, wherein the edges of said text area, line art area and area of an image having high contrast edge are sharpened by computing a pixel data threshold value for said region of interest;

and comparing each pixel value in said region of interest to said pixel data threshold;

if said pixel value is greater than the pixel data threshold value,
a first value is placed in the corresponding position of the said second format image;

if said pixel value is less than or equal to the pixel data threshold value,
a second value is placed in the corresponding position of the said second format image;

if said dynamic range is medium,

computing a desired number of second values to be placed in said second format image in the region of interest;

ordering the pixels in the region of interest according to the ordering of a predetermined halftone array;

altering the order of a pixel in said ordering if said pixel has a value which is greater than the value of the next pixel in said order by a predetermined reordering threshold value;

repeating said altering of the pixel order until the first and second values chosen for the second format image are no longer changed;

choosing said desired number of second values for the second format from the beginning of the said order, and assigning the remaining pixels values in the region of interest to said first value;
if said dynamic range is low,

using said predetermined halftone array to compute said first and second values for said second format image.

14. (Previously presented) A method for processing at least a portion of an image, the method comprising employing a first rule of halftoning, a second rule of halftoning, a third rule of half toning and a fourth rule of halftoning.

15. (Canceled)

D' concl.

16. (Previously presented) An article of manufacture comprising a computer usable medium having computer readable program means embodied therein for causing processing at least a portion of an image, the computer readable program code means in said article of manufacture comprising computer readable code means for causing a computer to effect the steps defined in claim 14.

17. (Canceled)